LISTING OF CLAIMS

This listing of claims replaces all prior versions, and listings, of claims.

1. (~~Original~~Currently Amended) A method for dry-cleaning metal residue from a semiconductor surface, comprising:

preparing the semiconductor surface using a chemical mechanical polish (CMP) process, the surface defining an intended metal trench pattern in a dielectric layer, the metal residue being located in an unintended scratch at the semiconductor surface; and

exposing the prepared semiconductor surface to a plasma and an inert gas, the plasma having ions reacting with the metal residue to form ~~an inert~~ a volatile gas, the surface being exposed to the plasma for a predetermined range of time.

2. (Original) The method of claim 1 where the step of preparing the semiconductor surface forms the metal residue in the scratch.

3. (Original) The method of claim 1 where the metal trench pattern comprises a metal material selected from the group consisting of tungsten, copper, aluminum, and aluminum alloy.

4. (Original) The method of claim 3 where the metal residue comprises the metal material of the metal trench pattern.

5. (Original) The method of claim 1 where the plasma comprises any one of CF_4, NF_3, CHF_3, C_4F_6, Br and Cl.

6. (Original) The method of claim 1 where the predetermined range of time of exposure to the plasma is based on the metal residue.

7. (Original) The method of claim 1 wherein the semiconductor surface is a substrate material comprising any one of a silicon substrate, silicon on insulator substrate, silicon on sapphire substrate, glass substrate, ceramic substrate, gallium arsenide substrate and metallized substrate.

8. (Original) The method of claim 1 where the scratch has a depth of less than approximately 10 % of a depth of the metal trench pattern.

9. (Original) The method of claim 1 where the metal residue in the scratch has a depth of approximately 5 nanometers.

10. (Original) A method of dry-cleaning a metal residue-filled scratch in a chemical mechanical polished semiconductor surface, the chemical mechanical polishing of the surface affecting the metal residue-filled scratch, the method comprising:

exposing the surface to a plasma, the plasma reacting with the residue to form a volatile gas, the plasma being diluted with an inert gas and having a pressure substantially in the range of 0.3 Torr, a gas flow rate of approximately 100 sccm and a temperature less than approximately 250 °C .

11. (Original) The method of claim 10 where the semiconductor surface defines a metal trench pattern.

12. (Original) The method of claim 11 where the metal trench pattern comprises any one of tungsten, copper, aluminum and aluminum alloy.

13. (Original) The method of claim 12 where the plasma comprises any one of CF_4, NF_3, CHF_3, C_4F_6, Br and Cl.

14. (Original) The method of claim 13 where the surface is exposed to the plasma for approximately 10 seconds.

15. (Original) The method of claim 13 where the scratch has a depth of less than 10% of a depth of the metal pattern.

16. (Original) A method for removal of chemical residues from a surface, the surface having a metal pattern formed in a dielectric substrate by a Chemical Mechanical Polishing (CMP) process, the method comprising:

plasma etching the surface to remove a predetermined thickness of the metal material.

17. (Original) The method of claim 16 where the residue comprises the metal smeared in an unintended trench on the surface, the metal being smeared as an unintended result of the CMP process of the surface.

18. (Original) The method of claim 17 wherein the plasma etching comprises exposing the surface to plasma for a predetermined amount of time to remove a desired thickness of the metal.

19. (Original) The method of claim 18 where the surface comprises a surface of a multilayer semiconductor device.

20. (Original) The method of claim of claim 19 where the metal comprises tungsten and the plasma comprises and one of CF_4, NF_3, CHF_3, C_4F_6, Br and Cl gases.